



Editor's Desk

Happy New Year 2017!

Another year passed by for RuTAG IIT Delhi with the usual events of workshops, technology developments, club activities, etc. In addition, a new initiative was taken by RuTAG IIT Delhi to recognize the contributions made by several faculty members of IIT Delhi and other institutes, namely, Prof. Ajit Kumar of IGNOU and Prof. G.P. Govil, Principal of Northern India Engineering College.

In a small function held on Sept. 22, 2016 under the banner RuTAG Club, faculty members were handed over a framed citation for their guidances/advices to the students and project staffs. All principal investigators were asked to share their experiences. Without any hesitation, all of them have expressed their satisfaction and happiness for being able to contribute for the social cause. I hope we can have more and more such faculty who will benefit the society, in general, and have their self-satisfaction, in particular.

In a recently held brainstorming session with the Principal Scientific Adviser (Dr. R. Chidambaram), it was decided to have about two RuTAG chapters under the mentorship of one RuTAG Center located in one of the IITs. Hence, any technical institute who is interested to take up projects with similar intentions may approach IITs with RuTAG centers for their association which will certainly make bigger impacts than what it is today.

All the best!

Prof. Subir Kumar Saha, Faculty

I am thankful to RuTAG for helping me to explore things outside my department and my comfort zone, which cannot be taught in lecture classes.

Abhishek Kumar, Student

At the age of globalization, we are more focused to improve the technologies to modernize the environment, which are already modern. Working for rural masses is real life problem and self-satisfying because small improvements in their technologies may change their livelihood drastically.

Srijan Prabhakar, Project Staff

Wishing You a Happy New Year 2017!

Chairman's Column

Let us Learn to Develop and Disseminate Appropriate Technologies to Serve the Real Needs of Rural Masses

Mahatma Gandhi was perhaps the staunchest critique of the highly-centralized, capital intensive modern technological development which was primarily propelled by the 'greed' of a few 'elite' rather than by the real needs of the masses. He could clearly discern intuitively the inadequacies and unsustainability of such a development and accordingly warned against its disastrous consequences much ahead of time.

However, under the influence of ongoing trends and prevailing pressures, we did not pay much heed to this foresight and much of the development in our country even after independence has moved forward in the same direction. Accordingly, the prevailing ethos, the current curricula and the ongoing R&D culture in our higher technical institutions does not provide us the right orientation and competence to identify the real indigenous needs of the masses and to evolve appropriate technical solutions, as also, the requisite wherewithal to facilitate their dissemination among those who badly need these inputs.

Infact, looking at the R&D trends in our country, will it be too harsh to say that in the zeal to become so called 'world class', we have landed up neither there nor here! It is well known that most of the innovative technologies required by our main stream industries are by and large imported from developed countries and much of our indigenous research effort remains confined to research thesis, technical reports or the research papers published in esoteric research journals and does not make its debut in real life applications. On the other hand, the real needs of the masses requiring appropriate solutions are hardly comprehended and addressed by the technical personnel. The mechanism for dissemination of indigenous innovative solutions also remains to be conspicuously missing.

This is the real challenge for the technical resource of the country, addressing which can no more be postponed and fortunately RuTAG provides a unique platform for initiation of this important task. When properly integrated with the Unnat Bharat Abhiyan, adequately strengthened and proliferated, it can paved way towards sustainable indigenous development of Rural India, which has continued to remain a long time expectation.

Prof. R. R. Gaur

Senior Project Consultant's Column

All the RuTAG Centres have been interacting with a large number of NGOs to identify new problems which could be taken up as small projects. Somehow, the number of new challenges has shown a distinct declining trend. Perhaps a different approach needs to be evolved to ensure that a fair number of new problems come up for research all-round the year. Another interesting phenomenon has also been noticed. In respect of improved technologies/products that are being used by the villagers, there is a perceptible demand for further improvement. Considerable time is therefore being spent by the faculties concerned to constantly upgrade the products. This, of course, is a welcome development; a clear indication of acceptance of better products.

Major Sabyasachi Chatterjee



RuTAG, IIT Delhi participated in 2nd India International Science Festival 2016, held at National Physical Laboratory, New Delhi during December 7-11, 2017 organised by Ministry of Science and Technology, Ministry of Earth Science and Vijnana Bharti (VIBHA) co-ordinated by Council for Scientific and Industrial Research (CSIR). RuTAG IIT Delhi got 'BEST STALL' award under Unnat Bharat Abhiyan (UBA) pavillion. Feedback from the visitors was encouraging such as:

- Inspiring and highly useful technologies for society needs!
- Wonderful efforts by students!



Fig. 1 Solar food dryer



Fig. 2 Conducting trials of Proto-type to lift a Downer cow



Fig. 3 Improved Chironji decortication machine



Fig. 4 Conducting trials of hirda decortication Machine developed by MPKV



Fig. 5 Hand-pump & Plumbing parts



Fig. 6 Newly developed Treadle Pump

1. Hybrid Solar Food Dryer to Dry Agriculture Produce

P.I. – Prof. Shireesh Kedare / Prof. Manaswita Bose, IIT Bombay

Collaborating NGO – BAIF Development Research Foundation, Maharashtra

This project addresses the issue of drying agricultural produce in a fast and energy efficient way while keeping the cost as low as possible. The focus of this project was to achieve continuous drying of the agricultural products, which was achieved using PCM (Phase change Material) by incorporating Hybrid Solar Food Dryer as shown in Fig. 1.

2. Designing a Portable System to Lift a Downer Cow

P.I. – Prof. Tanmay Bhandakkar, IIT Bombay

Collaborating NGO – Amboulim Nagrik Samiti, Goa

The ‘Downer cow syndrome’ affects pre-calving and post-calving cows. The animal affected by this syndrome suffers from weak leg muscles thus making it difficult for the animal to get up (from sitting position) or stand or walk. This condition can result in death if not treated on time. The project focuses on designing a portable system to lift a Downer cow without hurting the animal (Fig. 2). Our intervention is expected to facilitate lifting and carrying a ‘Downer cow’ for treatment and save its life.

3. Design Improvement of Chironji Decortication Machine

P.I. – Prof. Amit Arora / Prof. Upendra Bhandarkar, IIT Bombay

Collaborating NGO – Madhya Pradesh Vigyan Sabha (MPVS), Madhya Pradesh

Chironji is one of the Non-timber forest products (NTFPs) found in forest of Madhya Pradesh. The Chironji kernel has high demand and is used in making variety of sweets and desserts. The marginal communities living near jungles of Madhya Pradesh at present collect Chironji fruits and sell the seeds in local market without decortication. If the same Chironji seeds are decorticated, the kernel obtained will fetch a very high price in the market (around Rs. 1000/Kg). The NGO has designed a make-shift machine for decortication of Chironji seeds (Fig. 3). The project focuses on improving the design of this Chironji decortication machine to make it more efficient. The project is to benefit marginal communities from Madhya Pradesh.

4. Design improvisation of Hirda Decortication Machine

P.I. – Prof. Milind Rane, IIT Bombay

Collaborating NGO – Center for Social Action (CSA), Mumbai

Manual decortication of Hirda is an extremely time-consuming and strenuous activity. A machine designed by Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri has automated the task but is not able to achieve complete decortication of all the seeds (Fig. 4). An improvement in the performance of this machine was necessary which can be achieved by redesign of some critical components of the machine while introducing as little change to the overall operating procedure as possible. An attempt will also be made to introduce option of operating the machine by using pedals (without electricity).

5. Newly Developed Treadle Pump using Hand pump and Plumbing Parts

P.I. – Prof. S. K. Saha, IIT Delhi

Collaborating NGO – Gramodaya Rachnatmak Vikash Sansthan, Chariawha Khas, U.P

Treadle pump is a mechanical device, which uses human power to draw water from the ground. It is a twin-cylinder reciprocating water pump presently being used by thousands of small/marginal farmers in various parts of eastern U.P, Bihar, Orissa and other places. These are particularly popular in areas where water level is not too low (around 10m or less). Treadle pump was developed considering suitable modification in the pump, to make it more efficient and user friendly. The newly developed treadle pump was fabricated using locally available hand-pump and plumbing part (Fig. 5), with a sitting arrangement (Fig. 6). The operation of the treadle pump became easy and with incorporation of the seat, one can operate it comfortably while sitting.



Fig 7. Field testing of BDT



Fig 8. Shearing hair of Sheep



Fig 9. Sheep hair shearing device



Fig. 10. Testing of ground water level measuring device at chirava village

6. Modified Bullock Driven Tractor (BDT)

P.I. – Prof. Ajit Kumar, IGNOU, New Delhi

Collaborating NGO – Social Centre for rural initiative and advancement (SCRIA), Khori, Rewari, Haryana

Bullock driven tractor is a tilling device, which is more efficient than the conventional plough. It utilizes characteristics of a modern tractor, like providing comfort to the tiller. Comparable study of different Bullock Driven Tractors (BDT) was conducted by RuTAG-IIT Delhi. Various lifting and locking mechanisms were studied for lifting the attachments in the BDT. Rope and Winch mechanism was found to be most suitable and has been incorporated in modified BDT for lifting attachments. It is easy to operate at affordable price. The seat incorporated is a used-car seat to increase comfort of the farmer. Field-testing was done on October 3, 2016 (Fig. 7). The feedback from the farmer was satisfying.

7. Dissemination of Low Cost Sheep hair shearing device

P.I. – Prof. S. K. Saha, IIT Delhi

Co P.Is. – Prof. D. Ravi Kumar and Dr. Deepak Kumar, IIT Delhi

Collaborating NGO – Jansamarth, Tehri, Uttarakhand

Currently in most of the places, the shepherds use scissors to cut woolen fleece of sheep. The scissors need to be sharpened at regular interval. This drudgery induced manual method has problems associated with its sharpness, grip, and mere time requirement for shearing and pain to the person's hand who is using it. To mechanize the shearing process a device was developed in IIT DELHI which is cost effective and compact. The mechanised device reduced the shearing time from 30 minutes per sheep to 4 minutes only. The objective of the ongoing project is standardization and indigenous manufacturing of the device. In a field test at Palampur, during October 25-26, 2016, the indigenous motor and the flexible drive of the device (Fig. 8, 9) performed well.

8. Testing of Water Level Measuring Device

P.I. – Prof. A. K. Gosain, IIT Delhi

Collaborating NGO – Ram Krishna JAidayal Dalmia Seva Sansthan, Rajasthan

A team visited Chirawa village, Rajasthan on October 17, 2016 to test the ground water level measuring device (Fig. 10). Comparative tests were conducted in different wells with imported non-contact device and indigenous device.

Orientation and Felicitation Programme by RuTAG Club

Third RuTAG club orientation programme was organised on September 22, 2016. Prof. S. K. Saha, Professor and Head of Mechanical Engineering Department, IIT Delhi and co-ordinator of RuTAG IIT Delhi briefly introduced RuTAG to faculty and students. Major S. Chatterjee, Senior Project Consultant and Scientific Consultant, Office of the PSA, highlighted the mandate of RuTAG programme and expressed the need to involve more students and faculty members to fulfill the initiative of PSA. Prof. R.R. Gaur, Prof. Kohli, Prof. Veena Koul, Prof. M.R. Ravi, Prof. Ajit Kr., Prof. A.K. Gosain, Prof. G.P. Govil, Prof. PMV Subbarao, Prof. H.M. Chawla, Dr. Jitendra Khatait were felicitated.



Fig. 10



Fig. 11



Fig. 12

Fig 10. PI's, faculty members and students attending RuTAG orientation

Fig. 11. Prof. S. K. Saha Felicitating Prof. Sangeeta Kohli

Fig. 12. Prof. R.R. Gaur being felicitated by Prof. S.K. Saha, Prof. Rajendra Prasad and Prof. V.K. Vijay, Co-ordinator RuTAG IIT Delhi

Techno- Societal 2016

An International conference on advanced technologies for societal applications was organised at Pandharpur, Maharashtra during December 21-22, 2016. Mr. Pawan Kumar Tiwari, M.Tech. student, Applied Mechanics, IIT Delhi, presented a paper titled 'Treadle Pump Operation with Rotary Motion' in the conference. Great reviews and comments on the paper were received and work done under RuTAG IIT Delhi was appreciated.



CII 12th Agro Technology and Business Fair, 2016

RuTAG IIT Delhi participated in 12th Agro Tech 2016 Chandigarh organised by Confederation of Indian Industry (CII) during November 19-22, 2016. Shri Pranab Mukherjee (President of India) and Mr. Reuven Rivilin (President of Israel) inaugurated the 12th Agro Tech and Business Fair. RuTAG IIT Delhi demonstrated its technologies, namely, Ground water measuring device, Sheep Hair Shearing Device, Bullock Driven Tractor, etc. The response of the visitors was overwhelming.



Regional Workshop

RuTAG IIT Delhi conducted a regional workshop during July 28-29, 2016 at Jawarharlal Nehru Krishi Vishwa Vidyalaya (JNKVV), Krishinagar, Jabalpur, Madhya Pradesh. About 139 participants attended this program. Students and Faculties from Indian Institute of Information Technology Design and Manufacturing (IIITDM), Jabalpur and about 26 NGOs participated. Dr. Vijay Singh Tomar, Vice Chancellor JNKVV, Jabalpur appreciated the work done by RuTAG IITD in uplifting the rural society.



Visit to Nava, Jaipur

Mr. Raj Kumar Gupta and Mr. Davinder (RuTAG, IIT Delhi) visited Nava, Jaipur on May 26, 2016 for detail study of salt processing techniques and technological improvement needed in existing plants.



Visit to Ranchi, Jharkhand

RuTAG IIT Delhi team visited SRI Ranchi to demonstrate Haemoglobin testing device for tribal people, developed by Prof. Veena Koul of Centre for Biomedical Engineering (CBME), IIT Delhi.



Mentorship Review Committee (MRC) Orientation

RuTAG Club IIT Delhi participated in MRC orientation program on July 22-23, 2016. The aim was to sensitise the newly admitted students to IIT Delhi about the activities of RuTAG Club IIT Delhi.



RuTAG CENTERS

IIT DELHI	www.rutag.iitd.ac.in
IIT KANPUR	www.iitk.ac.in/rutag/
IIT KHARAGPUR	www.iitkgp.ac.in/rutag
IIT MADRAS	www.icandsr.iitm.ac.in/social_development
IIT MUMBAI	www.ctara.itb.ac.in/rutag/
IIT GUWAHATI	www.iitg.ac.in/mech/Rutag-pal/index1.htm
IIT ROORKEE	www.rutagiitr.wordpress.com

Contacts:

For technical advice and collaboration:

Prof. S. K. Saha, Editor
Ph. 011-26591135, E-mail: sahaiitd@gmail.com

For general queries:

Mr. Davinder Pal Singh/ Mr. Raj Kumar Gupta
RuTAG IIT Delhi Office
Ph. 011-26591385
Email: davinderiitd@gmail.com, rajkumarddr@gmail.com